

## The Campus Network – Expanding Library Services

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Helen Shuster, "The Campus Network – Expanding Library Services." *Proceedings of the IATUL Conferences*. Paper 10.  
<https://docs.lib.purdue.edu/iatul/1991/papers/10>

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## THE CAMPUS NETWORK - EXPANDING LIBRARY SERVICES

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The Gordon Library and the College Computer Center at Worcester Polytechnic Institute have developed a library program on the central campus Encore computer which is accessible to the entire college community via the campus network and which enables faculty, staff and students to receive or request specific library services via a terminal or PC in campus offices, labs, dormitories, or at home.

### BACKGROUND

Worcester Polytechnic Institute is the nation's third oldest private engineering college and was established in 1865. It is located in Worcester, Massachusetts, approximately 50 miles west of Boston. The current student body of almost 4,000 men and women includes about 1,200 full and part time graduate students with the opportunity to receive master's degrees in 18 disciplines and doctoral degrees in 11. Students attend WPI from 45 states and 46 foreign nations.

The Gordon Library supports the curriculum and research needs of the WPI community. Currently the library holds some 312,000 volumes, subscribes to over 2200 serials and houses a collection of over 785,000 technical reports on microfiche. The collection also includes WPI undergraduate project reports, graduate theses and dissertations, the WPI archives, music recordings and scores, films, and audio and video cassettes. Staffing consists of nine full time and two part time professional librarians, 12 full time and two part time support staff.

In 1981 the library became a member of C/W MARS (Central/Western Massachusetts Automated Resource Sharing), currently a network of over 60 academic, public, and medical libraries sharing an UTLAS system database running on Tandem hardware at a central site. The group will switch to the CARL system sometime in the fall of this year. The site is staffed by a network manager with other full and part time staff.

One of the major reasons for joining this network was that the Institution could not afford to purchase the library software and hardware necessary for its own system. In addition, there was no space available on the college computers at the time for such a program. Another major reason for joining C/W MARS was that a shared database would allow users to locate materials at member libraries in the region, such as the University of Massachusetts Medical Center for biomedical research information.

Two developments occurred within a relatively short period of time in 1989. The first was that UTLAS finally produced a usable public access catalog (PAC). The library was a beta test site for the C/W MARS online catalog in 1988 and enlisted the assistance of the College Computer Center (CCC) to deal with the technical aspects of the telecommunications at the library end. CCC was extremely helpful, and the online catalog was introduced in the library using four AT&T 6300 PC's as terminals. The second development was the installation and implementation of the WPI fiber optic backbone computer network, with ethernet LANS within each building connecting to the network. The library was interested in distributing the online catalog over the network and making it available from anywhere on campus. CCC was approached to see whether this could be accomplished. Discussion showed that the interest was mutual because CCC was also interested in the WPI community making use of the



new network. It took only a very short time before a program was written to allow users with an account on the central mainframe Encore computer to access the online catalog over the network from on and off campus.

For several years, the administration in CCC had supported the library's use of microcomputers by loaning most of them to the library instead of requiring payment. This support continued into the area of funding for two of the initial four ports required on the Encore in order to distribute the online catalog over the network.

In addition to responding to specific requests for technical assistance and programming expertise, the staff of CCC also made suggestions on designing and writing programs which would enable the library staff to monitor both the use of the catalog and any problems which might occur on the lines. A log file was written which monitored successful and unsuccessful attempts to use the catalog on the network. It kept track of the total time a user was using the catalog, date, and the beginning and end time. At the library's request, this was also programmed so that an ascii file of the activity could be downloaded into a dBase database and reports run in the library to count and summarize this activity. Another program was written so that each time a user had trouble with a line and was unable to access the catalog, a mail message would be sent to a library staff member. This alerting technique enabled library staff to monitor all the lines and make phone calls to the C/W MARS central site as necessary to reactivate the lines. The library was able to have a certain amount of control this way and it gave library staff the opportunity to learn a great deal more about a whole new world of Unix commands and working with a mainframe computer instead of PC's.

This then is the background against which the **library** program came into being. Gordon Library, with no computer or systems staff of its own, was very dependent on outside computers and outside technical computer expertise, but it had good, established working relationships with CCC and the network staff, and a few library staff were becoming quite knowledgeable in dealing with network problems, files on the Encore and Unix. Another important fact was that we knew we had the ability or could learn new skills in order to control certain aspects of such a program ourselves. Additionally, many operations throughout the library were automated either with inhouse dBase and Lotus programs or commercially programmed applications software, and each staff member had either his or her own PC or access to one used by one or two others.

The concept of the distributed library, the library without walls, is a very real one, and it was clear that such libraries were coming into existence in the early part of 1990. Articles were being written indicating that programs in addition to the online catalog should be a part of the library's online services. With this in mind, we approached CCC to see whether they could write a program so that faculty could order books over the network. In the process of designing this with the Acquisitions Associate in Technical Services, the idea was born that there should be a 'library' program on the Encore, where the online catalog was one choice and other services would be various menu choices.

#### DESCRIPTION OF THE **LIBRARY** PROGRAM

The **library** program is based on WPI's central mainframe academic computer, an Encore Multimax 520 running Umax 4.3 BSD and is available on 24 DECstations as well. In order to use the program via the network, users must have an account on the Encore. In addition, there are six terminals in the Gordon Library that run the program. These terminals run only the **library** program. No other Encore or network functions are available from them (e.g., e-mail, file transfer, etc.). These terminals are logged on to a generic user account



called **Gordon** and do not require a password. For the purposes of this paper, we will be talking about accessing the program via the network.

After logging on to the Encore (or DECStation), the user types **library** at the prompt and presses Return. The program's welcome message displays.

**Welcome to the George C. Gordon Library**

\*\*\*\*\*  
**PLEASE REMEMBER, THE LIBRARY WILL BE CLOSED ON THURSDAY, JULY 4TH.**

**THE ONLINE CATALOG WILL BE AVAILABLE VIA THE ENCORE, HOWEVER.**  
\*\*\*\*\*

To begin, please type the command letter for you selection from the menu and press Return. If you have questions or comments concerning the library program, call the Reference Department at ext. 5410, or send mail to drichard@wpi.

**Press the Return key to continue:**

One of the ways in which the library retains a measure of control over the program is the capability to edit certain screen displays. For example, authorized library staff can revise the welcome message as needed. Changes in library hours, announcements of new services, or alerts of scheduled downtime on the system are some of the reasons for editing this display.

Users proceed from the welcome screen to the program menu, from which they select the service or resource that they want to use.

- a** Search the library's online catalog.
- b** Place order for book purchase.
- c** Check previous book orders.
- d** Display library bulletin board.
- e** Exit from this program.
- h** Help for library program commands.
- i** Brief info on the library program.
- l** Interlibrary Loan.
- n** New Book Information.
- o** Other Library Catalogs on the Internet.
- p** Project Information.
- u** "UnCover" periodical article database.
- v** IMC Videotapes for WPI Courses.
- x** Make a reserve book request.

**Selection:**

Briefly, the 'library' program resources and services are:

- a** Search the library's online catalog.

Selection **a** allows the user to search Gordon Library's online catalog. The library is a member of C/W MARS, a regional network of libraries in Central and Western Massachusetts. In addition to WPI holdings, users also can search the holdings of over sixty other C/W MARS libraries. Users type **e** to exit from the catalog and return to the program menu.

Currently, WPI has ten lines available for online catalog access via the campus network. This includes access from the six terminals in the library itself as well as from other terminals on campus. When a user selects **a** from the menu, the **library** program attempts to connect the user to the first available line. If a line is in use, the program goes on to the next line



until a connection can be made. If all ten lines are in use at the same time, then the eleventh user will receive a "busy" message from the program and will be asked to try again shortly. This does not happen often, however.

- b Place order for book purchase.**
- c Check previous book orders.**

These two selections allow authorized users to order books for the library and to check the status of orders already placed. Authorized users include library staff and the faculty library liaison in each academic department. The program captures user login names from the Encore and checks those names against a file containing names of users authorized to order books.

- d Display library bulletin board.**

The library bulletin board lists current library hours and online catalog hours of availability; telephone numbers for library departments and offices; and information on current library exhibits. Authorized library staff are able to edit the bulletin board as needed.

- e Exit from this program.**

To exit from the library program and return to the Encore or DECStation prompts, users type **e** and Return.

- h Help for library program commands.**

Selection **h** leads to a help menu, from which the user can obtain further information about each library program selection. By typing **q** and <Return>, the user is brought back to the main menu.

- i Brief info on the library program.**

Selection **i** displays brief information about the services offered by the library program. Much of this is similar to what is found in the **help** menu. Menu selections **i**, **n**, **o**, **p**, and **v** are based in the Encore's **Emacs info** system, part of the Emacs editor, the preferred editing program on the Encore.

**Info** is arranged in a tree-structured format which lets the user start at a particular point and work down, across, or back up related branches of information. The system contains a wide variety of helpful resources. Among them are documentation for software packages that run on the Encore; documentation for the Emacs editor itself; as well as noncomputer-related campus resources. Included in the last category are the WPI Undergraduate Catalog; Student Handbook; the catalog of completed WPI undergraduate project reports; and resources available via the library program.

- l Interlibrary Loan.**

Selection **l** allows authorized users to request books, journal articles, and conference papers that Gordon Library does not own. The program captures the requestor's login name and checks it against the file of authorized users. Users not authorized to use the request form are advised to contact the ILL office. Completed requests are e-mailed to the ILL office.

Here's what an authorized user sees after selecting **l**:

**This Interlibrary Loan request service is currently limited to WSPI faculty and staff who would like to request books or periodical/conference papers from other libraries because these items are not held by the Gordon Library.**



If you do not have the information to complete the online request please come to the library for assistance.

Please expect to wait one week for in-city loans and 2-3 weeks for out-of-city loans.

\*\*\*\*\*

Different data are required for book requests as opposed to requests for periodicals/conference papers.

Do you wish to borrow a book? (y/n): n

Remember, a response of ! will abort the request ...

Periodical/conference title: Ergonomics

Volume: 34

Number:

Date: January 1991

Author of paper: W.D.A. Beggs

Title of paper: Psychological correlates of walking speed in the visually impaired

Beginning page: 91

Ending page: 102

Maximum willing to spend for photocopy: \$5.00

Department account number: 123456.7890

Your request is complete.

Do you want to review your request? (y/n) n

n New Book Information.

A faculty member suggested that the library add information about newly-acquired materials to the program menu. For years the library had distributed a printed list of new books, but had cut down significantly on the number of copies it distributed as duplicating and paper costs rose. This provides an inexpensive and more widely-distributed alternative to the paper list.

The library's acquisitions information is maintained in dBase files, which are uploaded into the Encore's info system. The library maintains editorial control of the list and is able to make it available quickly via the program.

Here is what the user sees after selecting n from the menu. The top level node with a menu of subject categories displays first. The list that follows has been abbreviated for space.

Node: Top

Up: (wpi)Top

LIBRARY ACQUISITIONS FOR JANUARY & FEBRUARY, 1990

\* Menu: Subjects

\* AERONAUTICS::  
\* CHEMISTRY::  
\* CIVIL ENG::  
\* COMPUTER SCIENCE::  
\* ELECTRICAL ENG::  
\* FIRE SAFETY::  
\* GENERAL ENG::

Menu item: Electrical<Return>

The user selects ELECTRICAL ENG and sees the following display.

**Node:** ELECTRICAL ENG, **Previous:** EDUCATION, **Next:** FIRE SAFETY, **Up:** Top

\* **Menu:** Titles under subject ELECTRICAL ENG

\* **TK 7825 C63 1989::**

Analog electronic handbook | GENERAL

\* **GE. CRD: 88-301::**

Characteristics of AL-TiSi<sub>2</sub> contacts to N<sup>+</sup> and p<sup>+</sup> silicon |  
MICROFICHE

\* **TK 5105 I34 1987::**

Date communication systems and their performance | GENERAL

\* **TK 5105.5 B565 1989::**

Data networks | GENERAL

**Menu item:** TK 7825<Return>

The user selects the call number for an individual title and arrives at the lowest level node, which provides brief bibliographic data for a recently added item.

**Node:** TK 7825 C63 1989, **Previous:** GE. CRD: 88-287, **Next:** GE. CRD: 88-301  
**Up:** ELECTRICAL ENG

**Title:** Analog electronics handbook

**Author:** Collins, T.H.

**Publisher:** Prentice Hall

**Year:** c1989

**Call Number:** TK 7825 C63 1989

**Location:** GENERAL

#### **o Other Library Catalogs on the Internet.**

Library online catalogs and databases are among the many resources that have become available with more widespread access to the Internet and other backbone networks. There are freely-distributed lists of library catalogs that may be accessed via the Internet. One such list is produced by Billy Barron of the University of North Texas. With Barron's permission, the library took his list, entered it into the Encore's **info** system, and made it available in the program as menu selection **o**.

Brief instructions for accessing hundreds of library catalogs are provided. WPI's direct connection to the Internet, affords users ready access to library catalogs and other resources located on remote computers.

After working through two prior menus, the user arrives at the **node** for the desired library catalog. After noting the instructions, the user can leave the program and attempt to connect to the remote catalog. An example of the Carnegie Mellon University node follows:

**Node:** Carnegie Mellon University, **Up:** United States

Carnegie Mellon University

Pittsburg, PA



To access the CMU library:

1. Type **TELENET CMULIBRARY.ANDREW.CMU.EDU.**
2. Enter **VT100** as terminal type.
3. Press **RETURN**.
4. Enter **1** at the menu.

To exit the CMU library:

1. Type **Q**.

## **P Project Information.**

Every undergraduate at WPI must complete, as degree requirements, projects in the major area of study and in an area relating some aspect of technology or science to society. These projects are the Major and Interactive Qualifying Projects, or MQP and IQP for short. Each project covers a minimum of three-fourths of an academic year and results in a report, often of thesis or dissertation length, which is kept in the library.

Because of the need for students, faculty, staff, and others to access completed project reports in a timely way, information concerning completed reports was added to the **info** system and made available via the **library** program. The information is transferred to the **Encore** from the student records program which resides on WPI's VAX administrative computer.

## **u "Uncover" periodical article database.**

The Uncover database developed by CARL (Colorado Alliance of Research Libraries) describes the contents of 10,000 journals, dating back to 1988. We felt that access to this database would be a valuable resource to the WPI community, especially in the face of potential periodical cuts and with the future enhancement of the program to deliver full text of the articles identified. The library purchased two passwords from CARL and CCC wrote a script so that users do not have to remember the password, nor type in the various telnet and CARL database commands to access Uncover. The user just presses **u** and waits a few seconds to be connected. Once in the database the user searches for specific periodical, subject, or author information. A request from a faculty member resulted in CCC creating a program enabling users to download citations into files in their **Encore** subdirectory, where they can be edited, printed out, or downloaded to a PC.

CCC also wrote a log file for this program so that authorized library staff can tell the amount of use of this resource as well as being alerted to various types of problems users have encountered in attempting to access Uncover.

## **v IMC Videotapes for WPI courses.**

WPI's Instructional Media Center (IMC), which, in conjunction with faculty, is responsible for the production of course-related videotapes, requested that listings of the tapes be available through the **library** program. The tapes are housed in the Audiovisual Room in the library. Because IMC staff already maintained the lists in computerized format, a system was developed whereby the IMC periodically could load its data into the same **info** system as other library programs. People needing information on videotapes for a particular course or faculty member can look up this information and then request the videotape number for use in the A-V room.



x     **Make a reserve book request.**

Faculty can use the x command to request that books in the Gordon Library collection be placed on course reserve at the library Circulation Desk. To initiate a request the faculty member must select a from the menu and access the online catalog. When the desired book record is found in the catalog and the Circulation Information Screen is displayed, the faculty member types x at the CHOICE> prompt. The program then prompts the user for the specific volume(s) needed; the course number; and the period of the reserve.

**CIRCULATION INFORMATION SCREEN     Worcester Polytechnic Institute Collection  
WORCESTER POLYTECHNIC INSTITUTE**

Cary, Howard B.  
Modern welding technology / Howard B. Cary.  
(MONOGRAPH)     Englewood Cliffs, N.J.: Prentice Hall,

LOCATION	FORMAT	STATUS
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\*\*\*\* HOLDINGS FOR WORCESTER POLYTECHNIC INSTITUTE \*\*\*\*

1	WPI/GEN	BK/SPEC	ON SHELF
TK4660 C37 1989			

F-FIRST	N-NEXT	P-PREVIOUS	B-BIB DISPLAY	OL-OTHER LOCATIONS
H-HELP	R-RETURN	Q-QUIT	<CR>-MENU	

CHOICE->x<Return>

There is only one volume on this circulation screen.

Do you want to place "TK4660 C37 1989" on reserve?

Answer "y" or "n", an empty line means "n": y

Please enter a course name consisting of two letters, followed directly by three or four numbers. e.g. cs1010  
What course will be using the volume? dr4321

Please enter a short (one line) description of the time period(s) of the reserve: Term E90

One volume was requested to be placed on reserve.

The program then sends this request to a file which is looked at daily by members of the Circulation Staff. The file contains the brief author, title, call number, and status information contained on the Circulation Screen as well as the information supplied by the faculty member making the request - the course number, and the period of time it should remain on reserve. The program automatically supplies the faculty name and department.

In addition, the program prints out the file contents in call number order so that staff can do systematic retrieval of the items in the stacks.

MONITORING AND TROUBLESHOOTING

The library is able to maintain a substantial degree of control over the library program, especially in terms of monitoring the operation of the program and troubleshooting problems. Authorized library staff are able to check the status and operation of parts of the program and then go in and "fix" problems. There are really two major areas in which the staff can



monitor, troubleshoot, and fix problems: (1) checking the status of the online catalog lines; and (2) checking the status of the program on the terminals operating in the library.

#### (1) Checking Online Catalog Lines.

Earlier we mentioned that the CCC staff wrote a program enabling library staff to monitor problems that occur on the catalog lines. Here is how this part of the program works. When a user attempts to connect to the catalog, the program captures the user name (in the case of the library-based terminals, the generic name "Gordon" is captured), date and time of day, and the line number to which the user was connected. Unsuccessful attempts are captured as well. All attempts, both successful and unsuccessful, are recorded to a log file, which staff members monitor to observe how often connections to the catalog were attempted and if there were unsuccessful attempts.

Unsuccessful attempts generate an e-mail message to the library staff member designated as the "cwmars manager". This staff member receives all of the mail messages indicating problems on the lines. The message, indicating the user name, date and time of day, and the failed line number, looks like this:

Date: Wed, 29 May 91 15:08:46 EST  
From: library (George C Gordon Library)  
Message-Id: <9105291908.AA22899@wpi.WPI.EDU>  
To: drichard  
Subject: C/W MARS Line Problem  
Status: RO

Please run 'mars\_report 1' to read about line problems.

The report should look something like:

Annex gordon line 10 (mars line L20P12) had 6 problems between Sat  
May 25 22:23 and Wed May 29 15:08

The staff member monitors his/her mail during the day, and when a trouble message appears, follows the line checking procedure. First, while logged on to the Encore, the staff member types the command "telnet gordon". This "gordon" is the annex in the basement of the library where all of the lines from C/W MARS and lines to and from the campus network enter and exit the library. After connecting to the annex, the staff member types the number of the problem line. The program asks for a user name and password. When these are accepted, the staff member presses Return once or twice to try to get a "prompt" from the online catalog.

These are the steps followed in troubleshooting potential line problems:

```
% telnet gordon<Return>
Trying...
Connected to gordon.WPI.EDU.
Escape character is '^]'.
9<Return>
Annex username: cbrown<Return>
Annex password: Maintenance <Return>
Permission granted
Attached to port 9
<Return><Return>
ERROR 1201: Illegal Request.
EXPERT CHOICE -->
```

If a prompt appears, the staff member knows that the line is "alive" and working. The problem may have corrected itself by the time the staff member



checked, or maybe the program was too "impatient" in trying to make a connection to that line. Because there are ten lines available, the program automatically bumps to the next one rather than just hanging up on the user.

If no prompt appears, the staff member assumes that the line has gone "dead" for some reason. The staff member then places a call to the C/W MARS central site and asks C/W MARS to restart the line. The library and C/W MARS staff members stay on the phone while the restart is tried. The library staff member, still logged on to the Encore, is able to observe the restart process on the screen, and check to see if it has been successful. Usually it is.

## (2) Checking Status of Terminals in Gordon Library.

The six terminals located on the main floor of the library running the library program are DEC VT320s. They are all "logged on" under the generic name **Gordon** and do not require user names or passwords. The only exceptions are book ordering, interlibrary loan, and reserve book requests for which the program must capture a user name in order to determine if the requestor has been authorized to use one of those functions. Because these terminals are in a very public area (the former card catalog area to be precise) and receive a lot of use, they are subject to users doing things to them, inadvertently or not, that require some type of staff intervention. In other words, sometimes these terminals get all fouled up.

Library staff usually are alerted to problems with terminals in the library by visual observation. Either the staff member sees something wrong on the screen and knows that the terminal is "hung", or a user will alert the staff to a problem. In either case there are procedures that the staff member can follow to diagnose and attempt to fix a problem. These procedures have been compiled into a "troubleshooting document" for the benefit of staff members who have to deal with problems as they arise.

First, the staff member checks to see if there is a problem with the terminal itself. For example, when certain keys are pressed, the terminal will appear to be "frozen". Sometimes users will press the HOLD SCREEN key rather than the PRINT SCREEN key. The two are right next to each other. HOLD SCREEN will make the terminal "freeze". Staff members are encouraged to look first for easily rectified problems. In this example, pressing HOLD SCREEN a second time will "unfreeze" the screen. At other times, simply resetting the terminal is enough to get it unstuck.

There are, of course, times when users get stuck in some part of the program and hit the wrong key to try to get out, or they hit a succession of wrong keys. Sometimes this causes a terminal to get bumped from the program, leaving it limbo. If the staff member deems this to be the problem, there is a set of procedures to be used that allow the staff member to assess and remedy the problem.

## DOCUMENTATION

The library and the CCC have provided documentation for program users in the help section of the menu and in the info system. In addition, the library has prepared a printed manual that is available at the terminals based in the library. The manual provides basic explanations of each of the program menu selections; information on searching the online catalog; and instructions for using the info system.

Mentioned earlier was the "troubleshooting document". This was prepared for staff use, especially staff members on duty alone, such as evenings and weekends, when other staff members are not available for consultation. While some staff have much more daily involvement in troubleshooting and monitoring,



others are less experienced. It was felt that a step-by-step guide to diagnosing and fixing problems would benefit the less experienced staff. So far, this approach seems to be working.

### CONCLUSION

The library program continues to develop as new needs become apparent. Some examples of this are as follows. Library staff and CCC are in the final stages of designing a periodical menu item. The OCLC union list of serials tape containing only WPI's holdings was used to extract certain information from the bibliographic record and local data records. CCC has written a program whereby users can search by title or corporate author and locate a periodical record which contains WPI's holdings and which also contains linking notes detailing the earlier or later title relationships. We plan to change menu selection 1 to include more detailed information about the library. We also are hoping to implement a "suggestion box" on the menu, where users can send staff their questions, problems, comments, and suggestions for improvements.

The program is dynamic in that it can readily respond to the needs of the user. As has already been shown, we implement new programs or enhancements to existing programs based on valid requests from users. Although we will need to implement further changes when C/W MARS switches from Utlas to the CARL system later this year, we feel confident that this can be accomplished relatively painlessly due to the cooperation and enthusiasm of CCC. If certain programs are no longer valid, we can remove them. We believe that for a comparatively small academic library we are able to offer the WPI community a wide variety of services and resources and provide them conveniently within the library itself and from outside the library as well. Our feedback from the faculty and students has been very positive, which is an encouraging sign that we are meeting current needs and using the technology at our disposal to the very best of our ability.